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**WO-A-89/05695**  
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## Description

The present invention relates to a liquid applicator as defined by the preamble of Claim 1 and having a case for containing a liquid such as a disinfectant solution and an applying member, housed in the case, for applying the liquid, which can be carried out in the fields or kept in a house for a sudden need and can apply the liquid such as a disinfectant solution on an affected part by opening the case.

Generally, as a disinfecting/curing means for use in the case of an emergency such as an external wound or the sting of an insect or for use in a house, a liquid such as a disinfectant solution contained in a medicine bottle is impregnated in an applying member such as absorbent cotton, and the applying member is used to clean an affected part or apply the solution on the affected part.

Examples of a conventional simple liquid applicator which can eliminate such a cumbersome handling are an applicator having an applying member with liquid permeable properties at an opening of a case of a liquid such as a disinfectant solution, for directly applying the liquid on an affected part by using the applying member, an applicator having a mechanism for spraying a liquid, and an applicator which seals a napkin-like applying member consisting of a non-woven fabric and containing a liquid.

In recent years, a liquid applicator 50 as shown in Fig. 1 is proposed as a sanitary liquid applicator which can be easily handled by combining advantages of the above conventional applicators (Published Unexamined Japanese Patent Application No. 63-181776). This liquid applicator 50 seals a liquid 54 such as a disinfectant solution in an amount which can be consumed at once in a case 52. The case 52 is constituted by a plunger portion 56 and a case main body 58 which are connected at an opening end 62 of the case main body 58. The case main body 58 is constituted by a large-diameter portion 58a and a small-diameter portion 58b continuous each other. An opening means 64 is formed in the small-diameter portion 58b (Fig. 1). In order to use this liquid applicator 50, the opening means 64 of the case 52 is opened (Fig. 2), and the liquid 54 such as a disinfectant solution is directly applied on an affected part by an exposed columnar applying member 66 (Fig. 3).

In addition, a liquid applicator 70 as shown in Fig. 4 is provided by the present assignee (Japanese Patent Application No. 01-30572). This liquid applicator 70 is formed to be substantially the same as the liquid applicator 50 shown in Fig. 1 except that a columnar applying member 86 is elongated. A case 72 is constituted by a plunger portion 76 and a case main body 78 which are

connected at an opening end 82 and seals a liquid such as a disinfectant solution.

A reinforcing core member 92 is inserted in the applying member 86 to support the elongated applying member 86. The reinforcing core member 92 has elasticity which allows the member 92 to be bent when the case 72 is opened and has rigidity which allows the member 92 to support the applying member 86 when a side applying portion 94 of the applying member 86 is used to apply the liquid on an affected part.

In order to use the liquid applicator 70, an opening means 84 of the case 72 is opened (Fig. 5), and the liquid is applied by the applying portion 94 of the exposed applying member 86 on an affected part (Fig. 6). Therefore, the liquid can be applied on a wide area of the affected part by one application action.

In the above liquid applicator 50, however, the columnar applying member 66 is obtained by binding a large number of long acetylcellulose-based fibers to form a columnar member as a whole or by using a porous material such as sponge. Therefore, since the columnar applying member 66 has no satisfactory rigidity, it is difficult to elongate its exposed portion. As a result, since the distal end face of the applying member is mainly used as an applying portion, it takes a long time to apply the liquid on a wide affected part, as shown in Fig. 3. Although the diameter of the columnar applying member 66 can be increased to apply the liquid on a wide affected part within a short time period, the entire applicator size is increased upon increasing the diameter of the case 58. Therefore, the applicator cannot be conveniently kept in a house or carried out in the fields.

The liquid applicator 70 according to the present assignee can apply a liquid on a wide area of an affected part by one application action. However, the structure of this applicator is comparatively complicated, or its entire length is increased since the applying member 86 is elongated.

Another liquid applicator is known from WO-A-89/05695. This document discloses the features of the preamble of claim 1. Particularly, in this prior applicator an applying member is contained in a case which is separated into two sections when broken. However, the connecting section between the two casing sections is formed to be round and therefore a breaking force to be applied to the casing in order to separate the sections is considerably high. Further, also the shape of a distal face of the applying member is round and therefore the area the liquid can be applied to in one application action is comparatively small.

The present invention, therefore, has been made in consideration of the above situation and has as its object to provide a liquid applicator

which has a simple structure and a length substantially the same as that of a conventional applicator can be opened easily and can apply a liquid on a wide affected part within a short time period without causing adhesion of the liquid on fingers after it is opened.

In order to achieve the above object, a liquid applicator of the present invention comprises the features of the Claim 1. Preferred embodiments are described in the Subclaims.

In a preferred aspect, a ratio of the thickness in the one direction to the thickness in the another direction perpendicular to the one direction is about 3 to 1.2. The shape of the distal end face is, e.g., substantially a rhombus or ellipse. The cross section of the opening means formed in the broken portion of the case may be an ellipse substantially the same as the shape of the distal end face of the applying member.

According to the liquid applicator having the above arrangement, at least the shape of the distal end face of the applying member for applying a liquid on an affected part is formed such that the thickness in the one direction of the distal end face is larger than that in the another direction perpendicular to the one direction. Therefore, when a portion of the case is broken to open the case and expose the applying member, a liquid can be applied on a wide affected part within a short time period by moving the distal end face of the applying member in a direction perpendicular to the direction of the larger thickness. That is, although the liquid applicator of the present invention has a simple structure and the entire axial length substantially the same as that of a conventional applicator, it can apply a liquid on a wide affected part within a short time period without causing adhesion of the liquid on fingers after it is opened.

This invention can be more fully understood from the following detailed description when taken in conjunction with the accompanying drawings, in which:

Fig. 1 is a partially cutaway longitudinal sectional view showing a conventional liquid applicator;

Fig. 2 is a partially cutaway longitudinal sectional view showing a state in which the applicator shown in Fig. 1 is opened;

Fig. 3 is a perspective view for explaining an application state of the applicator shown in Fig. 1;

Fig. 4 is a partially cutaway longitudinal sectional view showing another conventional liquid applicator;

Fig. 5 is a partially cutaway longitudinal sectional view showing a state in which the applicator shown in Fig. 4 is opened;

Fig. 6 is a perspective view for explaining an application state of the applicator shown in Fig. 4;

Fig. 7 is a perspective view showing a liquid applicator according to the first embodiment of the present invention;

Fig. 8 is a partially cutaway longitudinal sectional view showing the liquid applicator shown in Fig. 7;

Fig. 9 is a partially cutaway longitudinal sectional view showing a state in which a case main body of the liquid applicator is opened;

Fig. 10 is a side view taken along a line X - X in Fig. 9;

Fig. 11 is a partially cutaway sectional view showing a state in which a straight cylindrical portion of the case main body of the applicator shown in Fig. 7 is used as a cap;

Fig. 12 is a perspective view for explaining an opening state of the liquid applicator shown in Fig. 7;

Fig. 13 is a perspective view for explaining an application state of the applicator shown in Fig. 7;

Fig. 14 is a partially cutaway longitudinal sectional view showing a liquid applicator according to the second embodiment of the present invention; and

Figs. 15 to 17 are side views taken along lines XV - XV, XVI - XVI, and XVII - XVII shown in Fig. 14, respectively.

A liquid applicator 1 comprises a case 5 constituted by a cap portion 2 consisting essentially of a hard plastic material and having a substantially rhombic section and a case body 3 consisting essentially of a hard plastic material and having a substantially rhombic section. The cap portion 2 and the case body 3 are connected at an opening end 4 of the case body 3. A substantially rhombic applying member (to be simply referred to as an applying member hereinafter) 8 for applying a liquid 6 such as a disinfectant solution contained in the case 5 is housed in the case 5. Urging springs 9 are fixed to the cap portion 2, and a rhombic plate 10 is fixed to the distal ends of the springs 9. A hole 10a is formed in the plate 10. The case body 3 is constituted by a tapered cylindrical main body portion 3a having an inclined wall surface and a straight cylindrical detachable portion 3b. An opening means (referred to as separable connecting means) 11 having a thin circumferential wall is formed at a portion of the case body 3.

The liquid 6 such as a disinfectant solution is sealed in a hollow portion of the tapered cylindrical main body 3a as shown in Fig. 8. The applying member 8 is housed in the hollow portion of the tapered cylindrical main body 3a of the case body 3 molded into a rhombic shape as shown in Fig. 8.

That is, the circumferential surface of the applying member 8 is held by the inclined wall surface of the tapered cylindrical main body 3a, and its proximal end portion is supported by the rhombic plate 10.

Since the hole 10a for passing the liquid 6 is formed in the rhombic plate 10, the liquid 6 is smoothly supplied to the applying member 8. In addition, since the application pressure of the applying member 8 can be kept at a predetermined pressure by the urging springs 9 upon application of the liquid 6 on an affected part, the liquid 6 is not excessively applied on the affected part. Furthermore, since the applying member 8 has a substantially rhombic shape, a thickness in one direction, e.g.,  $\alpha$  shown in Fig. 10 is larger than a thickness in a direction perpendicular to the first direction, e.g.,  $\beta$  shown in Fig. 10. Therefore, when the applying member 8 is moved in a direction indicated by an arrow A in Fig. 10, the liquid 6 can be applied on a wide area of an affected part by one application action. A ratio of  $\alpha$  to  $\beta$  ( $\alpha/\beta$ ) is preferably 3 to 1.2. If the ratio exceeds 3, the separable connecting means 11 cannot be easily opened. If the ratio does not reach 1.2, an application area is undesirably decreased.

The cap portion 2 and the case body 3 consist essentially of a hard plastic material which is inactive, i.e., does not dissolve, is not denatured and does not swell, and less permeable with respect to the liquid 6. The cap portion 2 and the case body 3 preferably consist essentially of the same type of hard plastic material in order to perform ultrasonic fusing. Therefore, a homopolymer of polypropylene is preferably used as the hard plastic material to mold each part by injection molding, extrusion molding, blow molding, injection-blow molding, or vacuum molding. Note that the case body 3 and the cap portion 2 must be strongly connected to form the case 5 while the liquid 6 is contained in the hollow portion of the tapered cylindrical main body 3a. When the same type of hard plastic material is used, ultrasonic fusing can be performed to strongly connect these parts.

The separable connecting means 11 is formed in the straight cylindrical detachable portion 3b located at a side opposite to the cap portion 2 from substantially the middle point in the entire longitudinal direction of the case body 3 of the case 5. This thickness of the circumferential wall of this separable connecting means 11 is decreased to be 0.05 to 0.5 mm, and preferably, 0.1 to 0.2 mm. The separable connecting means 11 is, e.g., a V-shaped groove as shown in Fig. 11, and the radius of curvature of the groove bottom is minimized. It is important to form the separable connecting means 11 such that it does not easily receive a force in a normal state but can be easily broken

upon concentration of a stress on the groove bottom only when a force in a breaking direction is applied sideward on the case body 3.

In order to open the case 5, a user holds both sides of the separable connecting means 11 with both hands, puts the thumbs of both hands at both sides of the separable connecting means 11, and applies a force in the bending direction on the case body 3, thereby breaking the separable connecting means 11. As a result, the case body 3 of the case is separated into the tapered cylindrical main body portion 3a and the straight cylindrical detachable portion 3b, and the applying member 8 is exposed from the distal end of the tapered cylindrical detachable portion 3a as shown in Fig. 9. That is, the applying member 8 is located at the detachable portion 3a side, and its distal end face 7 is exposed by about 3 to 5 mm from the separable connecting means 11. Therefore, when the substantially rhombic distal end face of the applying member 8 is moved in the direction indicated by an arrow A shown in Fig. 10, the liquid 6 can be easily applied or dropped to clean a wide affected part within a short time period.

The applying member 8 preferably consists essentially of a material which has excellent permeability to the liquid 6, is inactive with respect to the liquid 6, has an excellent form retention property, provides a good feeling when the liquid is applied on a skin, and hardly produces pieces of the applying member. Examples of the material of the applying member 8 are a material obtained by binding a large number of long acetylcellulose-based fibers to form an elliptic column as a whole and a porous material.

In the tapered cylindrical main body portion 3a released from a sealed state upon opening of the separable connecting means 11, when a force in a direction indicated by an arrow B shown in Fig. 9 is applied on the applying member 8 of the liquid applicator 1, i.e., when the applying member 8 is set in an application state, it is compressed between an object to be applied (e.g., the back of hand) and the rhombic plate 10. A liquid portion passing through the hole 10a of the plate 10 soaks in the applying member 8 by a capillary action. Therefore, when the applying member 8 is compressed, the liquid 6 leaks from the distal end face 7 of the applying member 8 and is applied or dropped to clean a necessary portion.

The liquid applicator 1 of the present invention is assembled as follows. That is, the applying member 8 is inserted from the opening end 4 side into the case body 3, the liquid 6 is contained therein, and the cap portion 2 is connected at a flange portion of the opening end 4 by ultrasonic fusing, in which the cap has the urging springs 9 with the rhombic plate 10 fixed to their distal ends.

An operation of the liquid applicator 1 having the above arrangement will be described below. Since the cap portion 2 and the case body 3 of the liquid applicator 1 consist essentially of a hard plastic material, the cap portion 2 and the case body 3 serve as holding portions (i.e. a first handle grip) of the applying member 8 when the applicator 1 is used. In addition, since the cap portion 2 and the case body 3 are hard, the urging springs 9 of the cap portion 2 mounted on the opening end 4 of the case body 3 serve to positively push the liquid 6 contained in the case body 3. That is, as shown in Fig. 9, in an initial stage of use, the liquid 6 contained in the tapered cylindrical main body portion 3a of the case body 3 can be urged by urging the applying member 8 in the direction indicated by the arrow B in Fig. 9 and supplied to outside via the applying member 8 exposed from one side of the case body 3.

The separable connecting means 11 serves to open the case 5. That is, a user holds the cap portion 2 and the tapered main body 3a and straight cylindrical detachable portion 3b of the case body 3 of the case 5 with both hands, and puts fingers of both hands on both sides of the separable connecting means 11 (i.e. at the first and a second handle grip). Thereafter, the user applies a force on the fingers to bend the case body 3 at the position of the separable connecting means 11 to tear off the thin circumferential wall of the connecting means 11 from its one side, thereby separating the straight cylindrical detachable portion 3b from the tapered cylindrical main body portion 3a (Fig. 12).

A portion of the applying member 8 is exposed at the tapered cylindrical main body portion 3a side from the straight cylindrical detachable portion 3b removed upon opening of the case 5. As shown in Fig. 13, the substantially rhombic distal end face 7 of the applying member 8 has a shape suitable for applying a liquid on a wide affected part. That is, when the exposed substantially rhombic distal end face 7 of the applying member 8 is moved in the direction indicated by the arrow A in Fig. 13, a liquid can be applied on a wide affected part by the distal end face 7 of the applying member 8. In addition, when the distal end face 7 of the applying member 8 is moved in a direction indicated by an arrow E shown in Fig. 13, the distal end face can serve as a tip portion of a brush. Therefore, the applying member 8 can also apply a liquid on a narrow affected part. Since the liquid 6 is sealed in the tapered cylindrical main body portion 3a housing the applying member 8, the applying member 8 is wet with the liquid 6 in this state. Therefore, a desired portion can be applied or cleaned with the liquid 6.

Since the distal end portion of the straight cylindrical detachable portion 3b to be separated upon opening is hollow (Figs. 8 and 9), this distal end portion of the detachable portion 3b can be used as a cap to be fitted on the tapered cylindrical main body portion 3a. Therefore, the liquid applicator can be used a plurality of times (Fig. 11).

Fig. 14 is a partially cutaway longitudinal sectional view showing a liquid applicator according to the second embodiment of the present invention corresponding to Fig. 8 of the first embodiment. Figs. 15 to 17 are side views taken along lines XV - XV, XVI - XVI, and XVII - XVII in Fig. 14. The second embodiment basically has the same structure as that of the first embodiment except for a difference to be described below. Therefore, the same reference numerals as in the first embodiment denote the same parts and a detailed description thereof will be omitted.

In the second embodiment, the cross sectional shape of each of an applying member 8 and an separable connecting means 11 is not rhombic but substantially elliptic. This embodiment has been made in consideration of ease in opening of a case body 3.

As shown in Fig. 15, the applying member 8 is an elliptic column, and its cross sectional shape (the same as the shape of a distal end face 7) is formed such that a thickness  $\alpha 1$  in one direction of the applying member 8 is larger than a thickness  $\beta 1$  in a direction perpendicular to the first direction. Therefore, also in the second embodiment, when the applying member 8 is moved in a direction indicated by an arrow A shown in Fig. 13, a liquid 6 can be applied on a wide area of an affected part by one application action.

As shown in Fig. 16, the shape of the separable connecting means 11 is substantially elliptic. In terms of moldability of the case body 3, the cross sectional shapes of neck portions 15 and 17 of the case main body 3 near the two sides of the separable connecting means 11 are formed to be substantially elliptic as shown in Figs. 15 and 17, respectively. An outer appearance of the other portion of the case body 3 is substantially rhombic as in the first embodiment. As in the first embodiment, the thickness of the circumferential wall of a straight cylindrical detachable portion 3b of the separable connecting means 11 is as small as 0.05 to 0.5 mm, and preferably, 0.1 to 0.2 mm.

In the elliptic shape of the separable connecting means 11, a ratio ( $\alpha 0/\beta 0$ ) of a major axis  $\alpha 0$  to a minor axis  $\beta 0$  shown in Fig. 16 is preferably 3 to 1.2. If the ratio exceeds 3, the connecting means 11 cannot be easily broken. If the ratio does not reach 1.2, although the connecting means 11 can be easily broken, it is difficult to selectively use a

surface for applying on a wide area and that for applying on a narrow area in the applying member 8 having a shape corresponding to that of the separable connecting means 11. Note that the substantially elliptic shape includes an egg-like shape.

Since the sectional shape of the separable connecting means 11 is substantially elliptic, no straight portion is present in the cross section unlike in a rhombus, i.e., the entire section is a curve. Therefore, when the connecting means 11 is to be broken by an external force, a portion of the connecting means 11 at which the external force is concentrated cracks, and the external force is constantly concentrated at the breaking portion. Therefore, breaking rapidly progresses to finally, completely open the separable connecting means 11. If the sectional shape of the connecting means 11 is rhombic, however, an external force is applied on straight portions in the cross section. Therefore, since the external force is dispersed by the straight portions, it is difficult to concentrate the force at one point. Even when the connecting means 11 is broken and cracks, since the external force is not easily concentrated at the breaking portion, breaking does not easily progress. Therefore, non-separated portions of the separable connecting means 11 easily remain to make it difficult to open the connecting means 11.

In order to use the distal end portion of the straight cylindrical detachable portion 3b to be separated upon opening as a cap to be fitted on a tapered cylindrical main body portion 3a, a hollow portion inside the distal end of the straight cylindrical detachable portion 3b is formed to be elliptic similar to the neck portion 15 of the case. Therefore since the distal end portion of the straight cylindrical detachable portion 3b can be used as a cap in the same manner as that shown in Fig. 11 of the first embodiment, the liquid applicator of the second embodiment can be used a plurality of times.

The operation and the assembly method of the second embodiment except for those described above are exactly the same as those of the first embodiment.

The elliptic cross sectional shape of the separable connecting means 11 can be adopted even when the shape of the distal end face 7 of the applying member 8 is not elliptic but another shape, e.g., rhombic or rectangular. Note that even if the distal end shape is not elliptic, the applying member 8 preferably has an elliptic shape substantially the same as that of the connecting means 11 at a position adjacent to the connecting means 11. In this case, therefore, another shape of the distal end face of the applying member 8, e.g., a rhombus is gradually changed into an ellipse toward the connecting means 11.

Although a disinfectant solution is contained as the liquid 6 in the above two embodiments, the present invention is not limited to the above embodiments. For example, a toilet lotion or cleaning solution used in daily living can be arbitrarily contained as the liquid 6 in the case 5 of the liquid applicator 1.

## Claims

1. A liquid applicator comprising:
  - a case (5) comprising a main body (3a), a detachable portion (3b), and separable connecting means (11) formed therebetween, said connecting means (11) including a reduced thickness portion of said case (5); defining means for defining a space for containing liquid (6) in said main body (3a); liquid (6) contained in said space;
  - a column liquid applying member (8) arranged in said case (5) secured by said main body (3a), and extending into said detachable portion (3b), said liquid applying member (8) being made of liquid-holding material and being supplied with said liquid (6) from said space; and
  - a distal end surface (7) on said liquid applying member (8), on which said liquid (6) is applied, characterized in that
    - the inner and outer cross sections of said connecting means (11) are elliptical;
    - a first handle grip having a polygonal cross section is, formed as a part of said main body (3a); and
    - said distal end surface (7) on said liquid applying member (8) is longer in one direction than in another direction which is perpendicular to said one direction.
2. The liquid applicator of claim 1, further comprising a first reduced size neck portion (15) having elliptical outer and inner cross sections, said first reduced size neck portion (15) being formed on said main body (3a) between said connecting means (11) and said first handle grip.
3. The liquid applicator of claim 2, wherein said detachable portion (3b) comprises a hollow engaging portion formed at an end thereof, so that said detachable portion (3b) serves as a cap which is engageable with said first reduced size neck portion (15) after said case (5) is broken along said separable connecting means (11).
4. The liquid applicator of claim 3, comprising a second grip formed as a part of said de-

tachable portion (3b), said second grip having a polygonal cross section.

5. The liquid applicator of claim 4, further comprising a second reduced size neck portion (17) formed on said detachable portion (3b) between said connecting means (11) and said second grip, said second reduced size neck portion (17) having elliptical outer and inner cross sections. 5
6. The liquid applicator of claim 5, wherein said polygonal cross sections of said first handle grip and of said second grip are rhomboid, and wherein said polygonal cross section of said first handle grip is substantially the same as that of said polygonal cross section of said second grip. 10
7. The liquid applicator of claim 1, wherein said elliptical inner cross section of said separable connecting means (11) has long and short axes, the ratio therebetween said long and short axes being in the range of approximately 3 to 1.2. 15
8. The liquid applicator of claim 1, wherein said liquid applying member (8) is substantially close to the inner side surfaces of said main body (3a) and of said detachable portion (3b). 20
9. The liquid applicator of claim 1, wherein said distal end surface (7) of said liquid applying member (8) has said length in said one direction and said length in said another direction such that they have a ratio of approximately 3 to 1.2. 25
10. The liquid applicator of claim 9, wherein said distal end surface (7) of said liquid applying member (8) is rhomboid-shaped. 30
11. The liquid applicator of claim 9, wherein said distal end surface (7) of said liquid applying member (8) is elliptical-shaped. 35
12. The liquid applicator of claim 1, wherein said distal end surface (7) of said liquid applying member (8) extends into said detachable portion (3b) while said detachable portion (3b) is attached to said main body (3a). 40
13. The liquid applicator of claim 1, further comprising an urging spring (9) and a plate (10) provided in said space for containing said liquid (6), said urging spring (9) being supported by said main body portion (3a) such that said urging spring (9) extends in the axial direction 45

of said column liquid applying member (8), and said plate (10) being fixed to an end of said urging spring (9) and being in contact with a proximal end surface of said liquid applying member (8).

14. The liquid applicator of claim 13, wherein said plate (10) has a hole (10a) therein through which said liquid (6) passes. 50

#### Patentansprüche

1. Flüssigkeits-Auftragegerät, umfassend:  
 ein Gehäuse (5) mit einem Hauptkörper (3a), einem abehmaren Abschnitt (3b) und einem dazwischen geformten trennbaren Verbindungsmittel (11), das einen Abschnitt verringerter Dicke bzw. dünneren Abschnitt des Gehäuses (5) einschließt;  
 ein Bildungsmittel zum Bilden eines Raums zum Aufnehmen von Flüssigkeit (6) im Hauptkörper (3a);  
 eine in diesem Raum enthaltende Flüssigkeit (6);  
 ein im Gehäuse (5) angeordnetes, durch den Hauptkörper (3a) befestigtes oder festgelegtes und sich in den abnehmbaren Abschnitt (3b) erstreckendes säulenförmiges Flüssigkeits-Auftrageelement (8), das aus einem flüssigkeitshaltenden Material geformt ist und mit der Flüssigkeit (6) aus dem Raum versorgt wird; und  
 eine distale Stirnfläche (7) am Flüssigkeits-Auftrageelement (8), an welcher Stirnfläche die Flüssigkeit aufgetragen wird;  
 dadurch gekennzeichnet, daß  
 die inneren und äußeren Querschnitte des Verbindungsmittels (11) elliptisch sind;  
 ein erster Handgriff eines polygonalen Querschnitts als Teil des Hauptkörpers (3a) geformt ist und  
 die distale Stirnfläche (7) am Flüssigkeits-Auftrageelement (8) in der einen Richtung länger ist als in der anderen, zu dieser Richtung senkrechten Richtung. 55
2. Flüssigkeits-Auftragegerät nach Anspruch 1, ferner umfassend einen ersten, verkleinerte Größe besitzenden bzw. dünneren Halsabschnitt (15) mit elliptischen äußeren und inneren Querschnitten, wobei der erste dünnere Halsabschnitt (15) am Hauptkörper (3a) zwischen dem Verbindungsmittel (11) und dem ersten Handgriff geformt ist.
3. Flüssigkeits-Auftragegerät nach Anspruch 2, wobei der abnehmbare Abschnitt (3b) einen an seinem einen Ende geformten hohlen Einrast-

- abschnitt aufweist, so daß der abnehmbare Abschnitt (3b) als Kappe dient, die mit dem ersten dünneren Halsabschnitt (15) in Eingriff bringbar ist, nachdem das Gehäuse (5) längs des trennbaren Verbindungsmittels (11) aufgebrochen worden ist. 5
4. Flüssigkeits-Auftragegerät nach Anspruch 3, umfassend einen zweiten, als Teil des abnehmbaren Abschnitts (3b) geformten Griff mit einem polygonalen Querschnitt. 10
5. Flüssigkeits-Auftragegerät nach Anspruch 4, ferner umfassend einen zweiten dünneren, am abnehmbaren Abschnitt (3b) zwischen dem Verbindungsmittel (11) und dem zweiten Griff geformten Halsabschnitt (17) mit elliptischen äußeren und inneren Querschnitten. 15
6. Flüssigkeits-Auftragegerät nach Anspruch 5, wobei die polygonalen Querschnitte des ersten Handgriffs und des zweiten Griffs Rhomboiden sind und wobei der polygonale Querschnitt des ersten Handgriffs im wesentlichen der gleiche ist wie der polygonale Querschnitt des zweiten Griffs. 20 25
7. Flüssigkeits-Auftragegerät nach Anspruch 1, wobei der elliptische innere Querschnitt des trennbaren Verbindungsmittels (11) lange und kurze Achsen aufweist und das Verhältnis zwischen den langen und kurzen Achsen im Bereich von etwa 3 bis 1,2 liegt. 30
8. Flüssigkeits-Auftragegerät nach Anspruch 1, wobei das Flüssigkeits-Auftrageelement (8) im wesentlichen nahe an den Innenseitenflächen des Hauptkörpers (3a) und des abnehmbaren Abschnitts (3b) liegt. 35 40
9. Flüssigkeits-Auftragegerät nach Anspruch 1, wobei die distale Stirnfläche (7) des Flüssigkeits-Auftrageelements (8) die Länge in der einen Richtung und die Länge in der anderen Richtung derart aufweist, daß diese Längen ein Verhältnis von etwa 3 bis 1,2 besitzen. 45
10. Flüssigkeits-Auftragegerät nach Anspruch 9, wobei die distale Stirnfläche (7) des Flüssigkeits-Auftrageelements (8) rhomboidförmig ist. 50
11. Flüssigkeits-Auftragegerät nach Anspruch 9, wobei die distale Stirnfläche (7) des Flüssigkeits-Auftrageelements (8) elliptisch geformt ist. 55
12. Flüssigkeits-Auftragegerät nach Anspruch 1, wobei sich die distale Stirnfläche (7) des Flüssigkeits-

sigkeits-Auftrageelements (8) in den abnehmbaren Abschnitt (3b) erstreckt, während (wenn) der abnehmbare Abschnitt (3b) am Hauptkörper (3a) angebracht ist.

13. Flüssigkeits-Auftragegerät nach Anspruch 1, ferner umfassend eine Vorbelastungsfeder (9) und eine im Raum zum Aufnehmen der Flüssigkeit vorgesehene Scheibe (10), wobei die Vorbelastungsfeder (9) durch den Hauptkörperabschnitt (3a) so gehalten ist, daß sich die Vorbelastungsfeder (9) in der Axialrichtung des säulenförmigen Flüssigkeits-Auftrageelements (8) erstreckt, und die Scheibe (10) an einem Ende der Vorbelastungsfeder (9) befestigt ist und an einer proximalen Stirnfläche des Flüssigkeits-Auftrageelements (8) anliegt.

14. Flüssigkeits-Auftragegerät nach Anspruch 13, wobei die Scheibe (10) mit einer Bohrung (10a) versehen ist, durch welche die Flüssigkeit (6) hindurchtritt.

#### Revendications

1. Applicateur de liquide comprenant :
- une enveloppe (5) comprenant un corps principal (3a), une partie amovible (3b), et un moyen de raccordement séparable (11) formé entre ce corps et cette partie, ledit moyen de raccordement (11) comprenant une partie d'épaisseur réduite de ladite enveloppe (5) ; un moyen de délimitation pour délimiter un espace destiné à contenir un liquide (6) dans ledit corps principal (3a) ;
  - un liquide (6) contenu dans ledit espace ;
  - un élément colonnaire (8) d'application de liquide disposé dans ladite enveloppe (5), assujéti par ledit corps principal (3a) et s'étendant jusque dans ladite partie amovible (3b), ledit élément (8) d'application de liquide étant formé d'un matériau se chargeant de liquide et étant alimenté avec ledit liquide (6) depuis ledit espace ; et
  - une surface d'extrémité distale (7) se trouvant sur l'élément (8) d'application de liquide et sur laquelle ledit liquide (6) est appliqué,
- caractérisé** en ce que :
- les sections transversales intérieure et extérieure dudit moyen de raccordement (11) sont elliptiques ;
  - une première poignée ayant une section transversale polygonale est formée en tant que partie dudit corps principal (3a) ; et
  - ladite surface d'extrémité distale (7) se trouvant sur ledit élément (8) d'application de liquide est plus longue dans une première direction que dans une autre direction qui est



- perpendiculaire à ladite première direction.
2. Applicateur de liquide selon la revendication 1, comprenant, en outre, une première partie col (15) de dimensions réduites ayant des sections transversales extérieure et intérieure elliptiques, ladite première partie col (15) de dimensions réduites étant formée sur ledit corps principal (3a) entre ledit moyen de raccordement (11) et ladite première poignée. 5
  3. Applicateur de liquide selon la revendication 2, dans lequel ladite partie amovible (3b) comprend une partie d'assemblage creuse formée à une de ses extrémités de telle sorte que ladite partie amovible (3b) sert de capuchon qui peut être assemblé avec ladite première partie col (15) de dimensions réduites après que ladite enveloppe (5) a été rompue le long dudit moyen de raccordement séparable (11). 10
  4. Applicateur de liquide selon la revendication 3, comprenant une seconde poignée formée en tant que partie de ladite portion amovible (3b), ladite seconde poignée ayant une section transversale polygonale. 15
  5. Applicateur de liquide selon la revendication 4, comprenant, en outre, une seconde partie col (17) de dimensions réduites formée sur ladite partie amovible (3b) entre ledit moyen de raccordement (11) et ladite seconde poignée, ladite seconde partie col (17) de dimensions réduites ayant des sections transversales extérieure et intérieure elliptiques. 20
  6. Applicateur de liquide selon la revendication 5, dans lequel lesdites sections transversales polygonales de ladite première poignée et de ladite seconde poignée sont rhombiques, et dans lequel ladite section transversale polygonale de ladite première poignée est sensiblement identique à celle de la section transversale polygonale de la seconde poignée. 25
  7. Applicateur de liquide selon la revendication 1, dans lequel ladite section transversale intérieure elliptique du moyen de connexion séparable (11) a un axe long et un axe court, le rapport entre ledit axe long et ledit axe court étant compris entre environ 3 et 1,2. 30
  8. Applicateur de liquide selon la revendication 1, dans lequel ledit élément (8) d'application de liquide est situé substantiellement près des surfaces latérales intérieures dudit corps principal (3a) et de ladite partie amovible (3b). 35
  9. Applicateur de liquide selon la revendication 1, dans lequel ladite surface d'extrémité distale (7) dudit élément (8) d'application de liquide a ladite longueur dans ladite première direction et ladite longueur dans ladite autre direction de sorte que ces longueurs présentent un rapport d'environ 3 à 1,2. 40
  10. Applicateur de liquide selon la revendication 9, dans lequel lesdite surface d'extrémité distale (7) dudit élément (8) d'application de liquide a une forme rhombique. 45
  11. Applicateur de liquide selon la revendication 9, dans lequel ladite surface d'extrémité distale (7) dudit élément (8) d'application de liquide a une forme elliptique. 50
  12. Applicateur de liquide selon la revendication 1, dans lequel ladite surface d'extrémité distale (7) dudit élément (8) d'application de liquide s'étend jusque dans ladite partie amovible (3b), tandis que ladite partie amovible (3b) est fixée audit corps principal (3a). 55
  13. Applicateur de liquide selon la revendication 1, comprenant, en outre, un ressort de poussée (9) et une plaque (10) disposés dans ledit espace destiné à contenir le liquide (6), ledit ressort de poussée (a) étant supporté par ladite partie corps principal (3a) de sorte que ledit ressort de poussée (a) s'étend dans la direction axiale dudit élément colonnaire (8) d'application de liquide, et ladite plaque (10) étant fixée à une extrémité du ressort de poussée (a) et étant en contact avec une surface d'extrémité proximale dudit élément (8) d'application de liquide.
  14. Applicateur de liquide selon la revendication 13, dans lequel ladite plaque (10) comporte un trou (10a) à travers lequel passe ledit liquide (6).

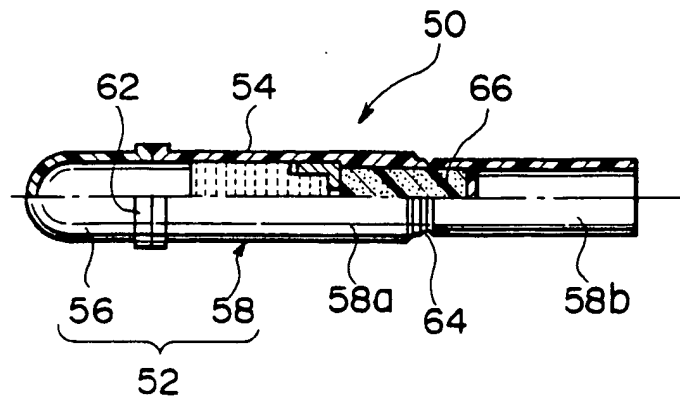


FIG. 1

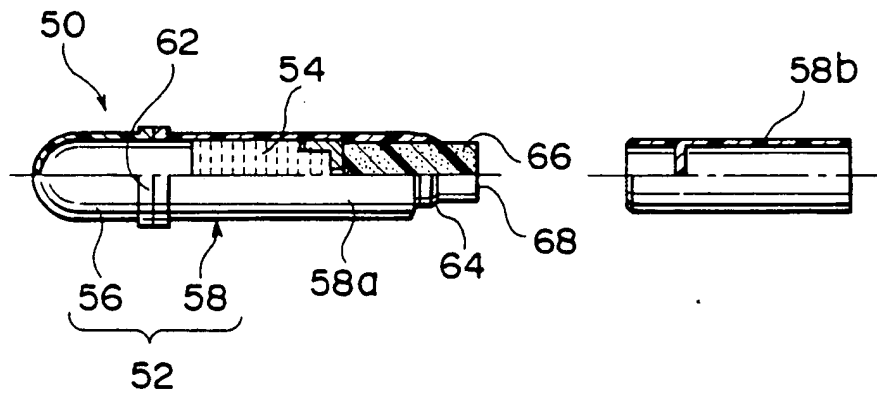


FIG. 2

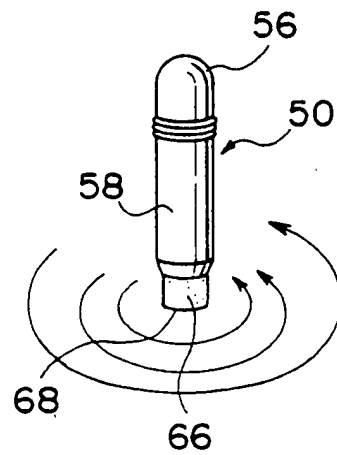


FIG. 3

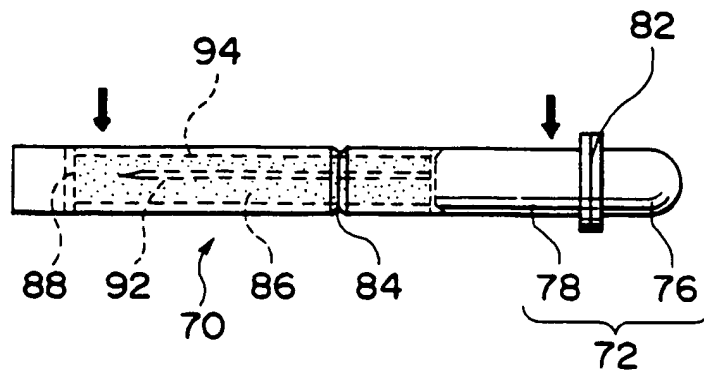


FIG. 4

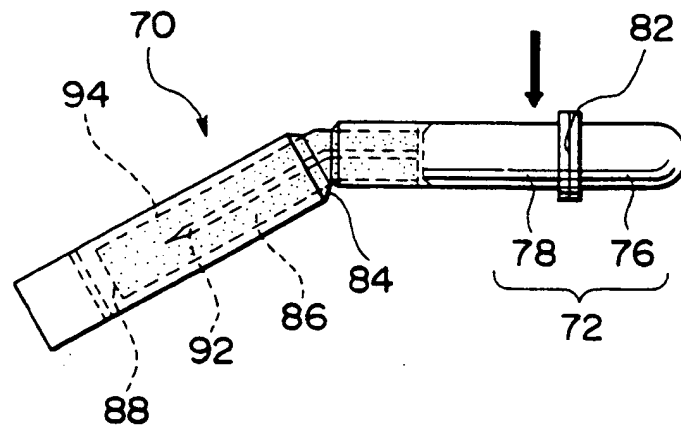


FIG. 5

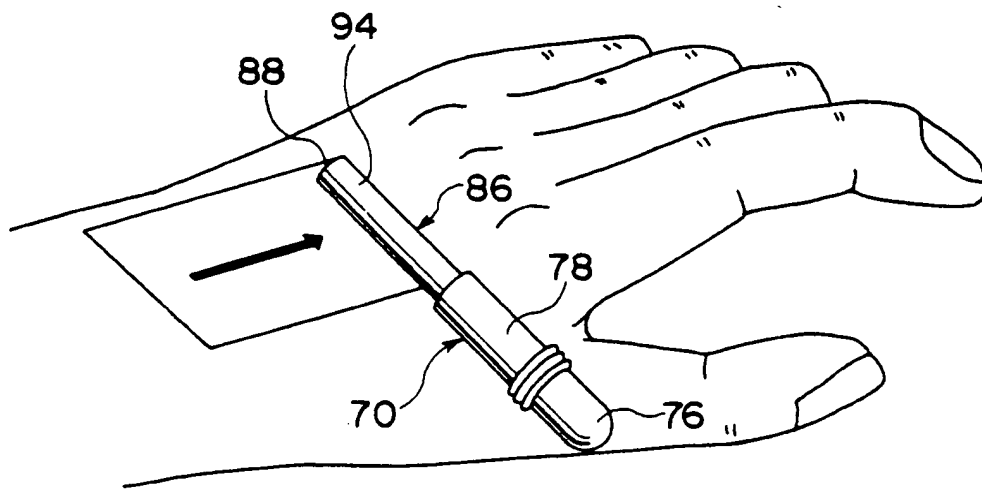


FIG. 6

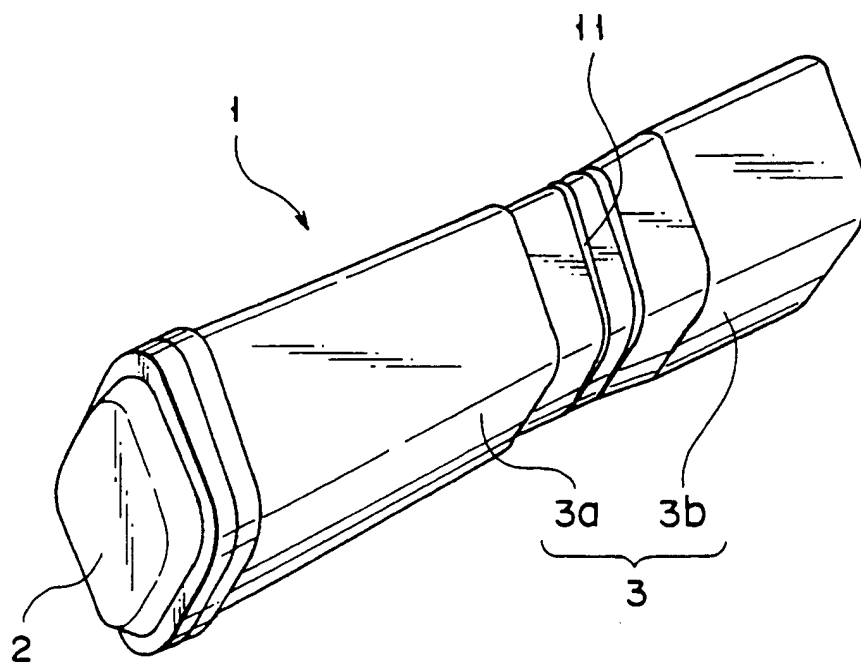


FIG. 7

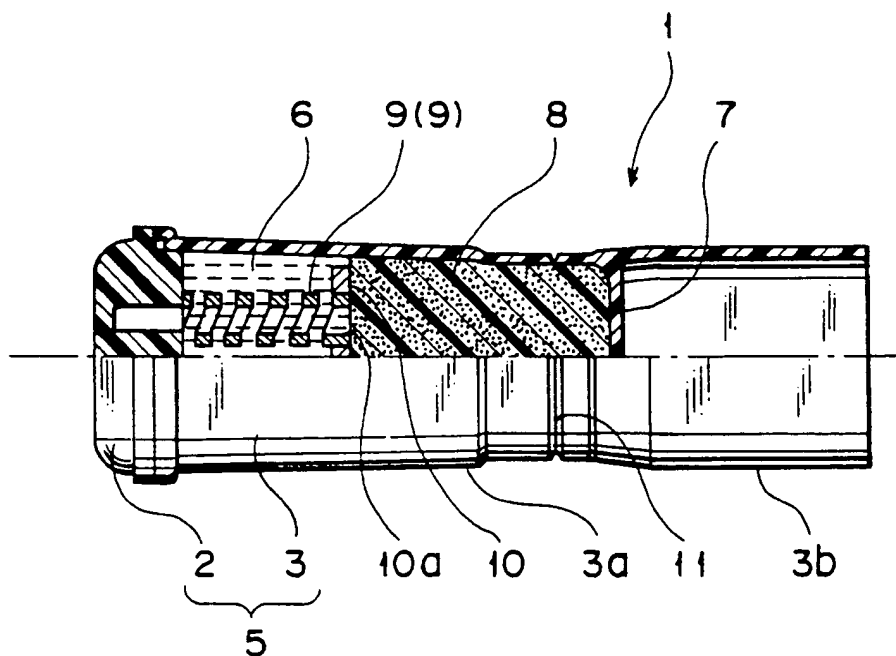


FIG. 8

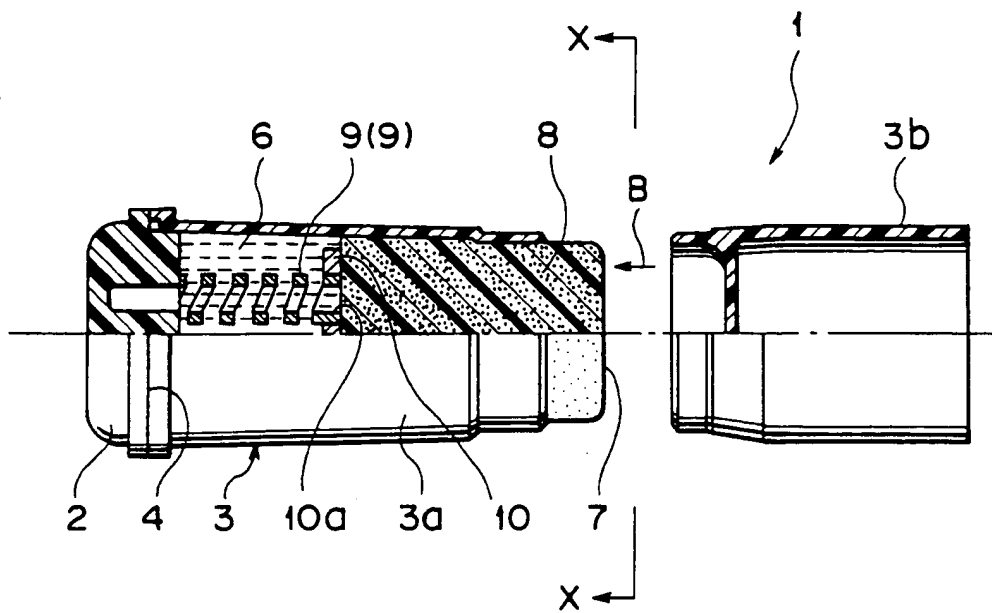


FIG. 9

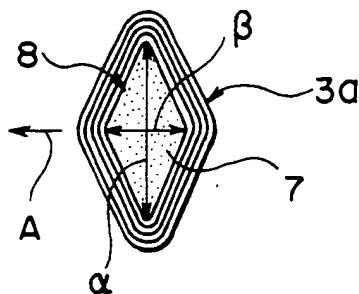


FIG. 10

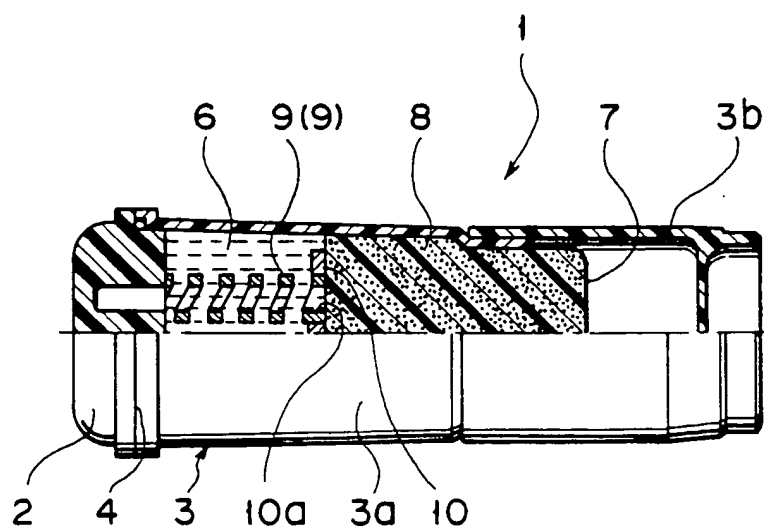


FIG. 11

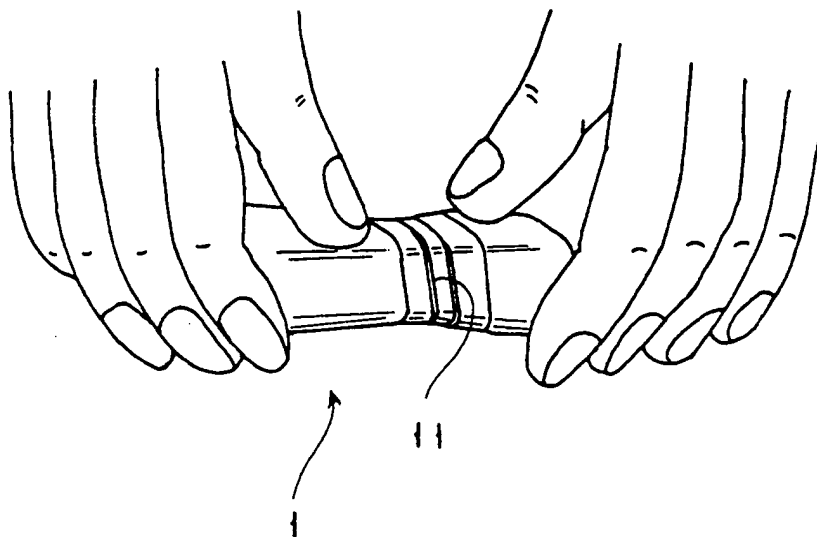


FIG. 12

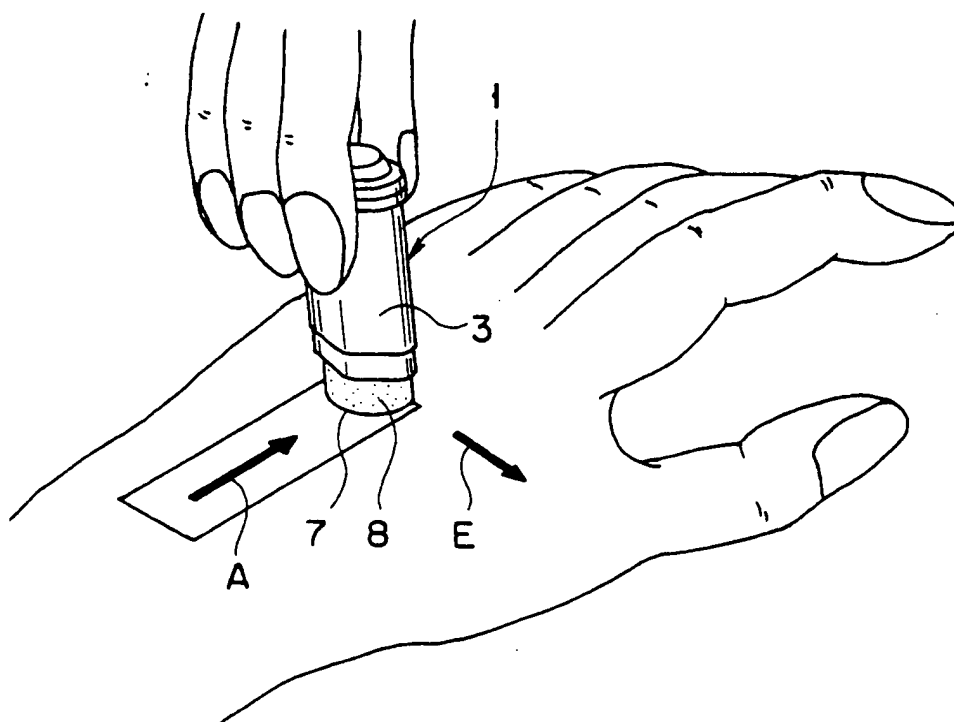


FIG. 13

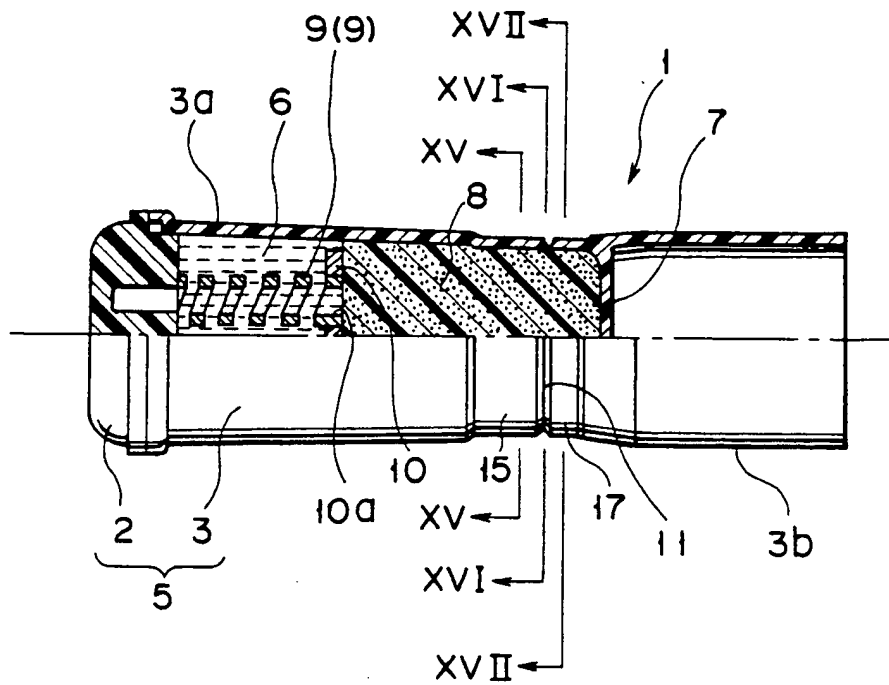


FIG. 14

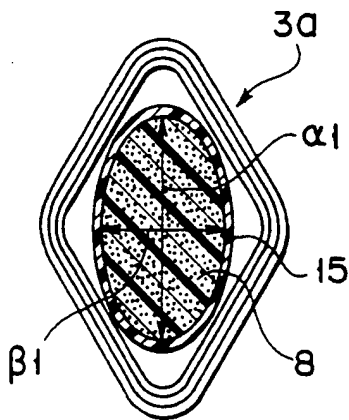


FIG. 15

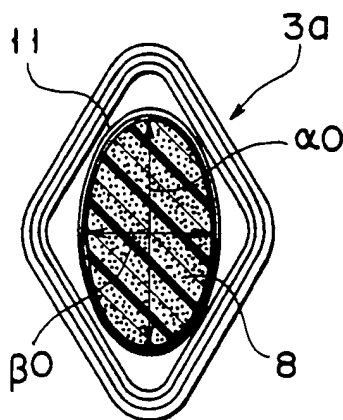


FIG. 16

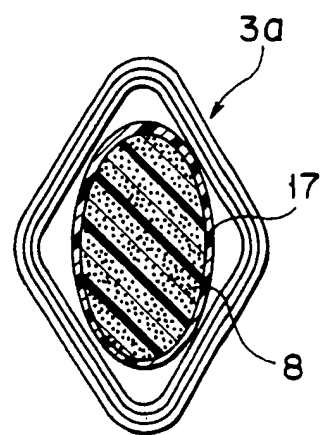


FIG. 17

**Liquid applicator.**

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Publication date: 1991-02-06  
Inventor(s): HONDA SHINZO (JP); HIROSE KAZUNORI (JP); KANDA ZENSHO (JP)  
Applicant(s): TERUMO CORP (JP)  
Requested Patent: ☐ EP0411578, B1  
Application Number: EP19900114702 19900731  
Priority Number(s): JP19890199591 19890801; JP19890199592 19890801  
IPC Classification: A61M35/00  
EC Classification: A61M35/00B2  
Equivalents: AU6003890, AU625186, DE69014255D, DE69014255T, ☐ US5054948  
Cited Documents: WO8905695; US4415288; WO8503275; US4282986; US3618604

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**Abstract**

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A liquid applicator includes a case (5) for containing a liquid (6) and an applying member (8), housed in the case (5), for applying the liquid (6). The case (5) is broken to expose the applying member (8), thereby allowing application of the liquid (6) via the applying member (8). The shape of the distal end face (7) of the applying member (8) is formed to be substantially rhombic or elliptic so that the thickness in one direction is larger than the thickness in another direction perpendicular to the one direction. By moving the distal end face (7) of the applying member (8) in the another direction perpendicular to the one direction, the liquid (6) can be applied on a wide affected part within a short time period.

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